

Tutorial No. 5: TCP/IP Model Internet Layer

Exercise 01:

To which class do the following addresses belong?

1. 142.26.67.89
2. 171.12.15.78
3. 12.15.4.55
4. 192.24.76.123
5. 221.55.67.123
6. 123.86.78.23
7. 126.19.76.23

Exercise 02:

In this exercise, you need to determine how many bits are required to create the requested number of subnets.

1. 84 subnets
2. 145 subnets
3. 7 subnets
4. 1 subnet
5. 15 subnets

Exercise 03:

From a network ID and a desired number of subnets, calculate the subnet mask and the number of hosts per subnet.

1. Network ID: 148.25.0.0 and 37 subnets
2. Network ID: 198.63.24.0 and 4 subnets
3. Network ID: 110.0.0.0 and 1000 subnets
4. Network ID: 175.23.0.0 and 550 subnets
5. Network ID: 209.206.202.0 and 60 subnets

Exercise 04:

Suppose there is a network with the IP address 195.180.125.0. You need at least 22 subnets.

1. How many bits do you need to borrow?
2. What is the total number of subnets available?
3. How many hosts per subnet do you have?
4. What is the subnet mask?
5. Provide the range of available host addresses on the first usable subnet.

Exercise 05:

A computer P1 with the following network parameters:

IP Address: 200.100.10.60

Subnet Mask: 255.255.255.224

1. Encode the IP address in binary.
2. What is the class of the network?
3. What is the subnet address?
4. What is the broadcast address for this subnet?
5. Does the IP address 200.100.10.35 belong to this subnet?

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Exercise 06:

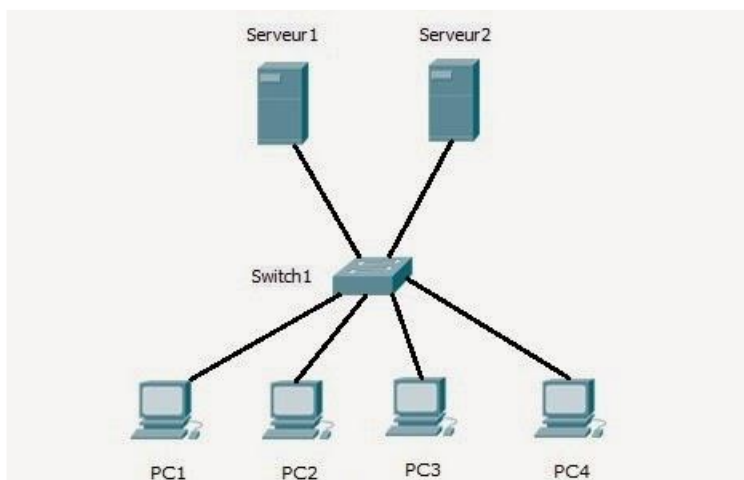
Consider the following IP address:

172.16.5.32 /24

1. Provide the subnet mask.
2. Write this mask in binary.
3. What is the class of the network?
4. What is the subnet address?
5. What is the broadcast address for this subnet?

Exercise 07:

You work in a medical office. All the computers in the office are networked as shown in the illustration in Appendix A. We are dealing with a network using the TCP/IP protocol. The IP addresses of each node in the network are listed in Appendix B. For all of them, the default mask is 255.255.255.0.



Appendix A

Machine	IP address
PC1	192.168.10.6
PC2	192.168.10.7
PC3	192.168.10.8
PC4	192.168.10.9
Server 1	192.168.10.100
Server 2	192.168.10.200

Appendix B

1. What is the architecture of this network?
2. Indicate what the IP address of the network is.
3. Determine the number of machines that can be connected to this network.
4. What is the broadcast address of this network?
5. What are the different subnets obtained if the 4th octet of the new mask is: 11000000?

Exercise 08:

Suppose there is an IP network with the address 194.170.25.0. You need at least 20 subnets with at least 5 (usable) hosts per subnet.

1. How many bits do you need to borrow?
2. What is the total number of subnets you will have?
3. How many hosts per subnet do you have?
4. What is the subnet mask?
5. Provide the range of available host addresses on the first usable subnet.

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Exercise 09:

Suppose there is an IP network with the address 192.52.0.0. You borrow 4 bits to create subnets.

1. What is the class of this IP address?
2. What is the total number of subnets available?
3. How many hosts per subnet do you have?
4. What is the subnet mask?
5. Provide the range of available host addresses on the second usable subnet.

Exercise 10:

We assign the network 200.100.1.0 /24. We need to place 20 hosts in each subnet.

1. How many bits are needed in the host portion of the assigned address to accommodate at least 20 hosts?
2. What is the maximum number of usable host addresses in each subnet?
3. What is the maximum number of defined subnets?
4. What are the addresses of all the defined subnets?
5. What is the broadcast address of subnet number 3?